Fig. 1

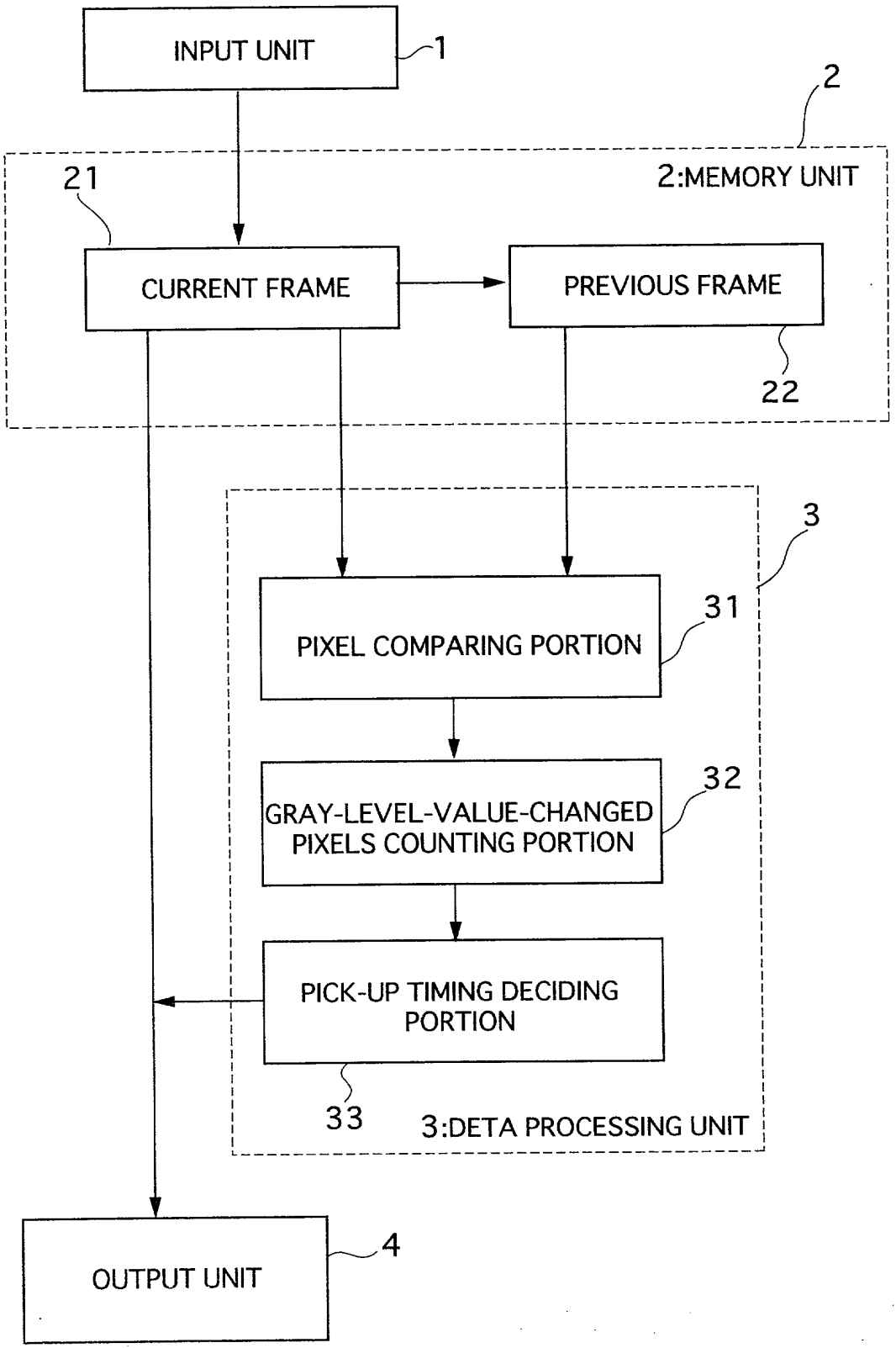

INPUT UNIT
1
2
2:MEMORY UNIT
21
CURRENT FRAME
PREVIOUS FRAME
22
3
PIXEL COMPARING PORTION
31
GRAY-LEVEL-VALUE-CHANGED PIXELS COUNTING PORTION
32
PICK-UP TIMING DECIDING PORTION
33
3:DETA PROCESSING UNIT
OUTPUT UNIT
4

Fig. 2

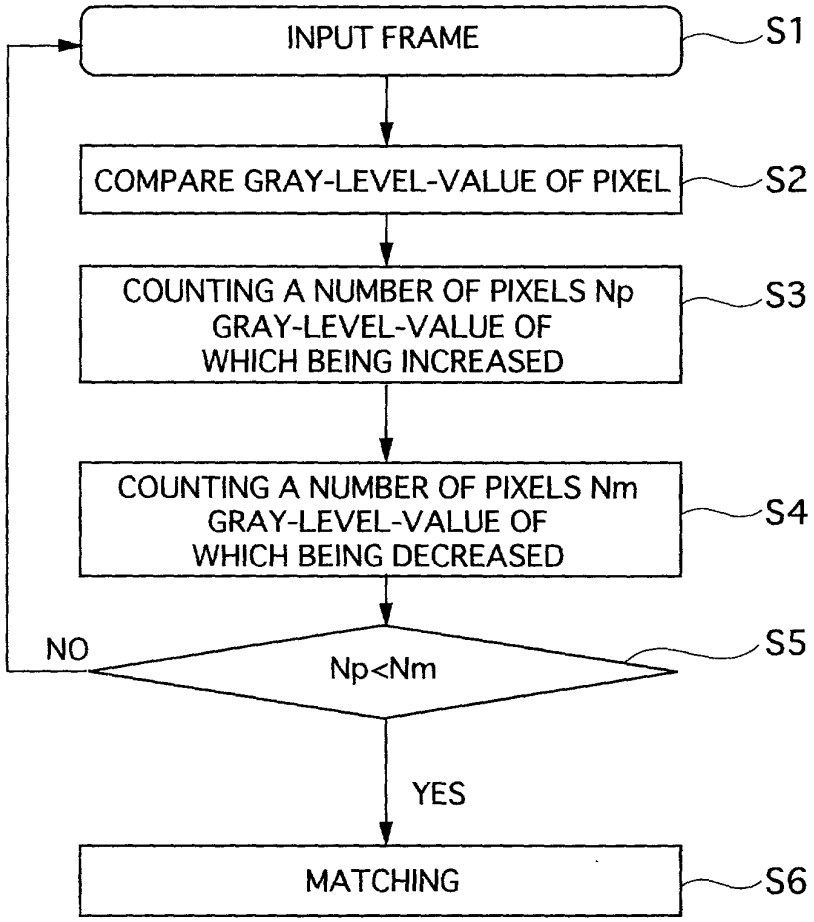

INPUT FRAME
S1
COMPARE GRAY-LEVEL-VALUE OF PIXEL
S2
COUNTING A NUMBER OF PIXELS Np
GRAY-LEVEL-VALUE OF
WHICH BEING INCREASED
S3
COUNTING A NUMBER OF PIXELS Nm
GRAY-LEVEL-VALUE OF
WHICH BEING DECREASED
S4
NO
Np<Nm
S5
YES
MATCHING
S6

Fig. 3

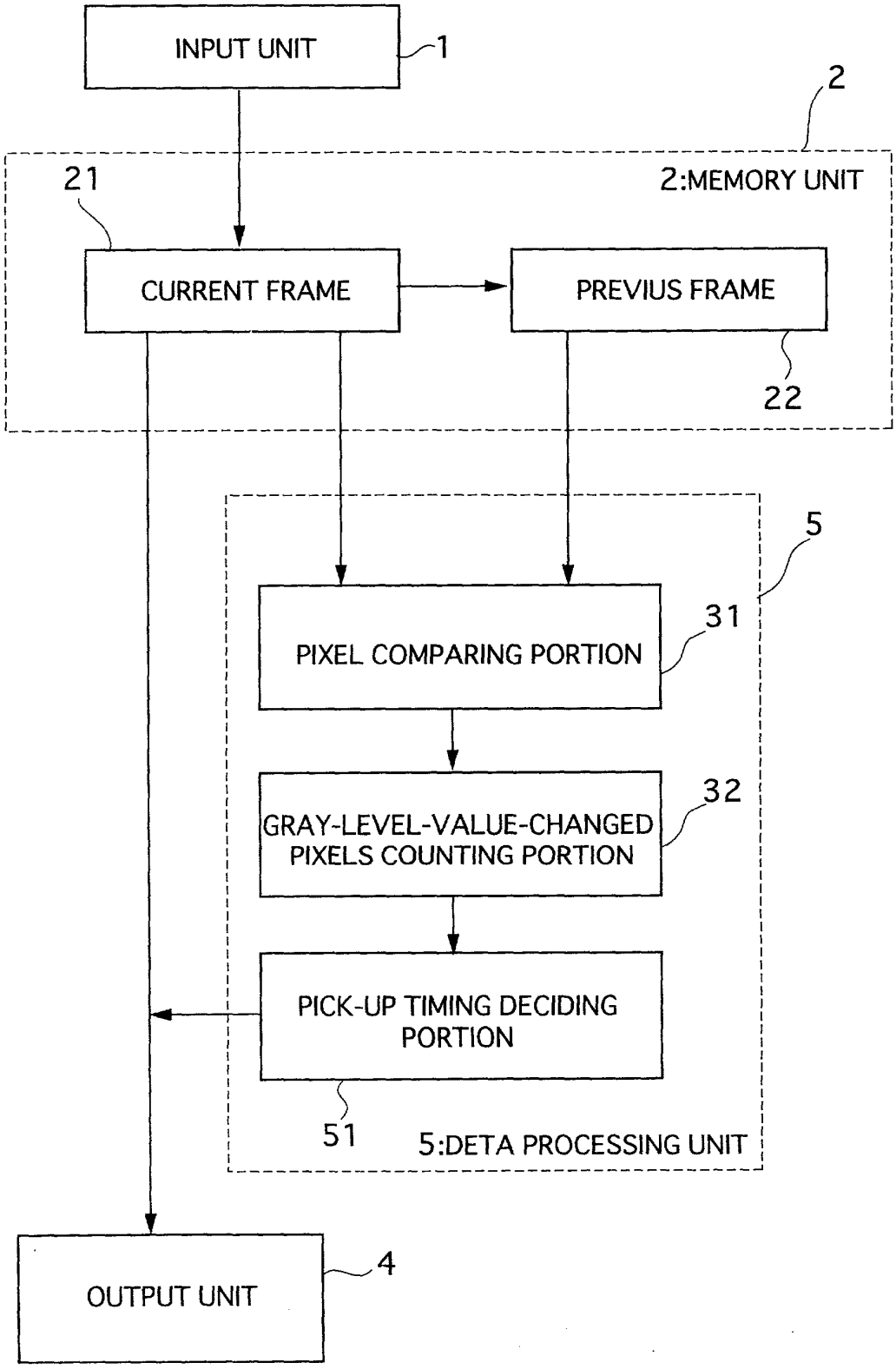

INPUT UNIT
1
2
21
2:MEMORY UNIT
CURRENT FRAME
PREVIUS FRAME
22
5
PIXEL COMPARING PORTION
31
GRAY-LEVEL-VALUE-CHANGED PIXELS COUNTING PORTION
32
PICK-UP TIMING DECIDING PORTION
51
5:DETA PROCESSING UNIT
OUTPUT UNIT
4

Fig. 4

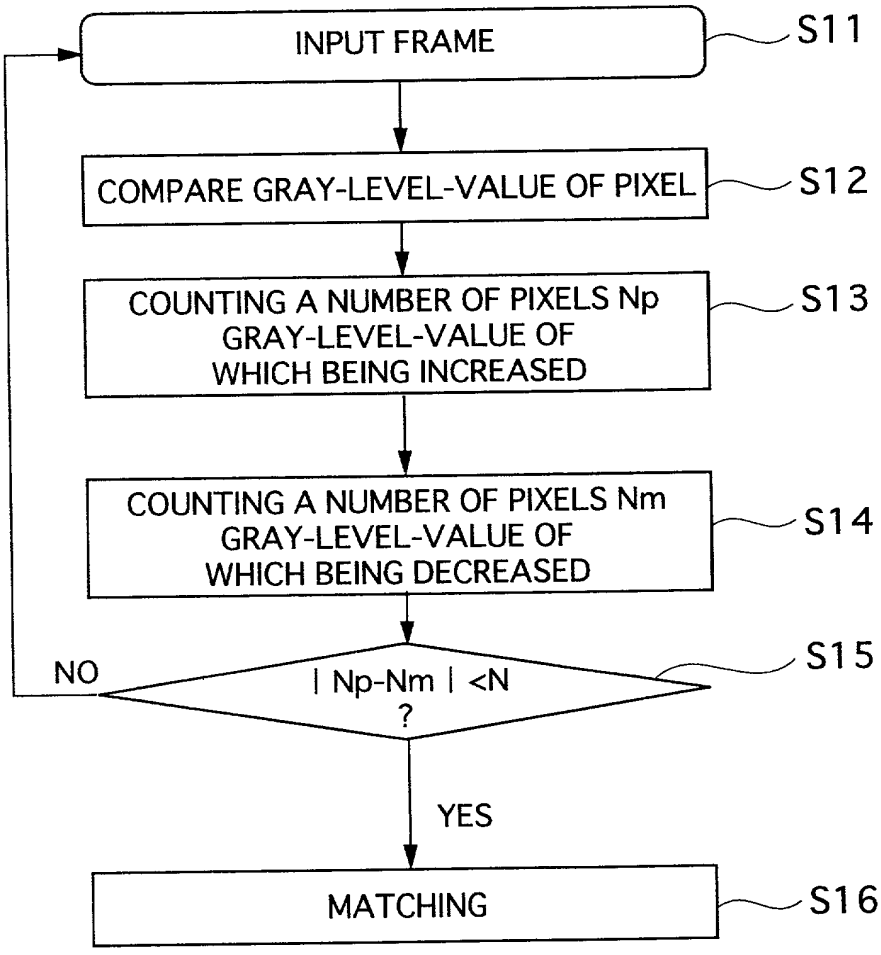

INPUT FRAME
S11
COMPARE GRAY-LEVEL-VALUE OF PIXEL
S12
COUNTING A NUMBER OF PIXELS Np GRAY-LEVEL-VALUE OF WHICH BEING INCREASED
S13
COUNTING A NUMBER OF PIXELS Nm GRAY-LEVEL-VALUE OF WHICH BEING DECREASED
S14
| Np-Nm | <N ?
S15
NO
YES
MATCHING
S16

Fig. 5

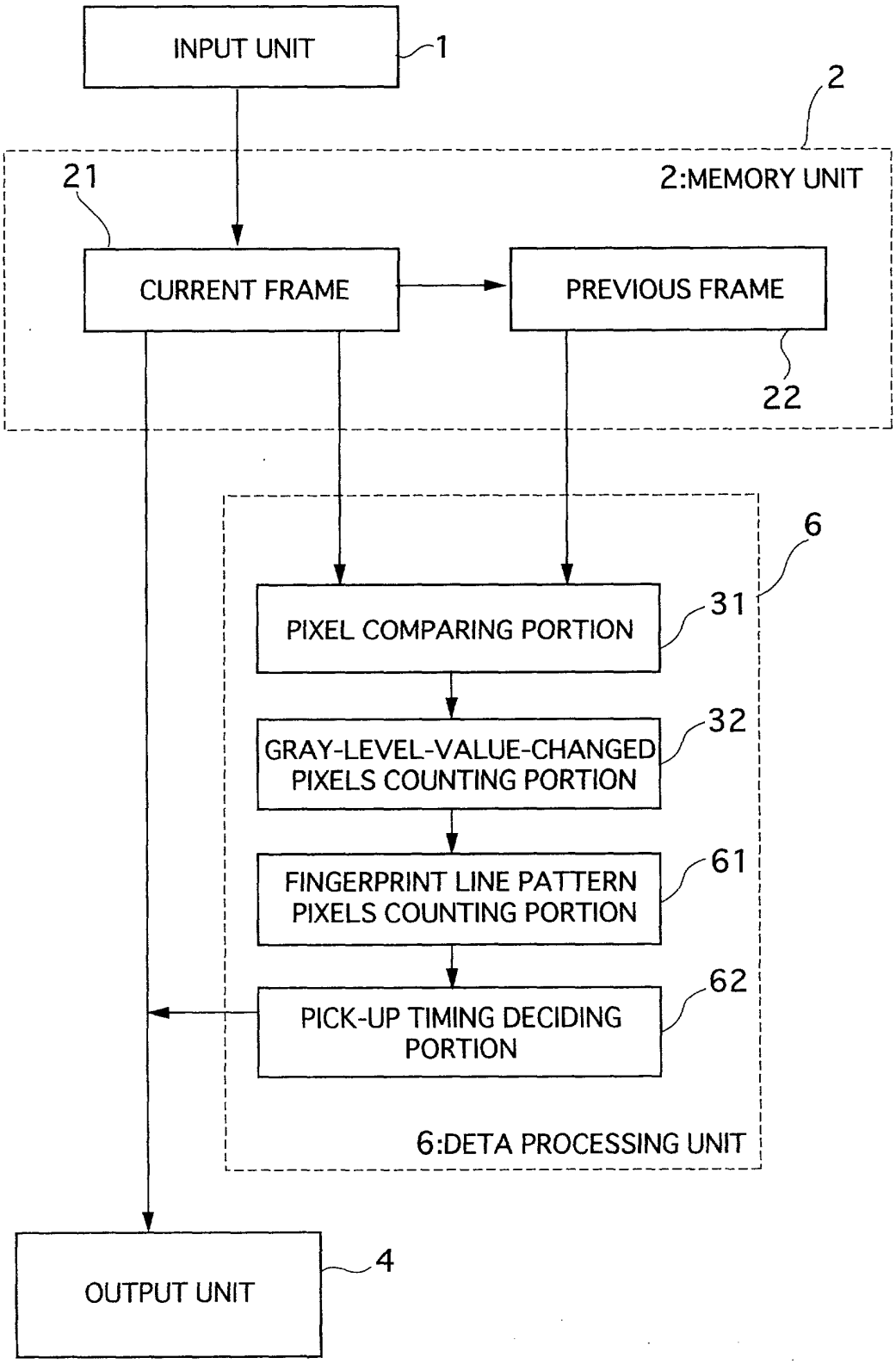

INPUT UNIT
1
2
2:MEMORY UNIT
21
CURRENT FRAME
PREVIOUS FRAME
22
6
PIXEL COMPARING PORTION
31
GRAY-LEVEL-VALUE-CHANGED PIXELS COUNTING PORTION
32
FINGERPRINT LINE PATTERN PIXELS COUNTING PORTION
61
PICK-UP TIMING DECIDING PORTION
62
6:DETA PROCESSING UNIT
OUTPUT UNIT
4

Fig. 6

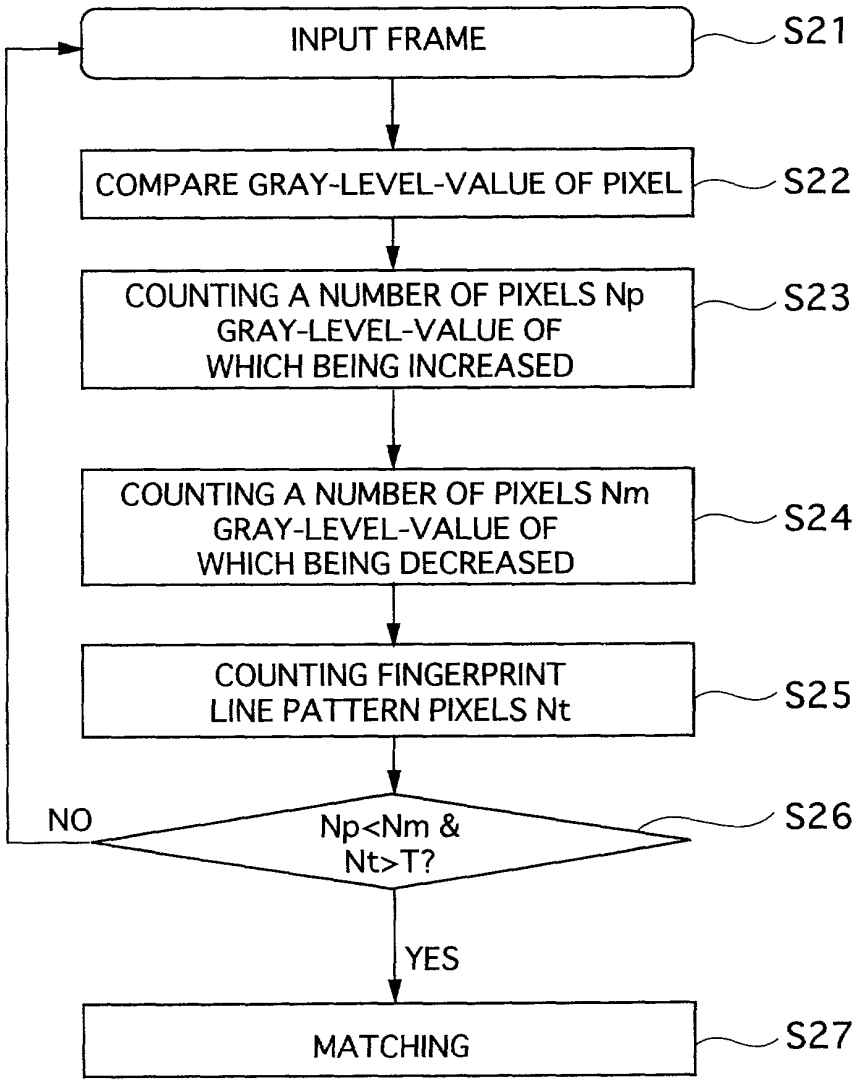

INPUT FRAME
S21
COMPARE GRAY-LEVEL-VALUE OF PIXEL
S22
COUNTING A NUMBER OF PIXELS Np GRAY-LEVEL-VALUE OF WHICH BEING INCREASED
S23
COUNTING A NUMBER OF PIXELS Nm GRAY-LEVEL-VALUE OF WHICH BEING DECREASED
S24
COUNTING FINGERPRINT LINE PATTERN PIXELS Nt
S25
NO
Np<Nm & Nt>T?
S26
YES
MATCHING
S27

Fig. 7

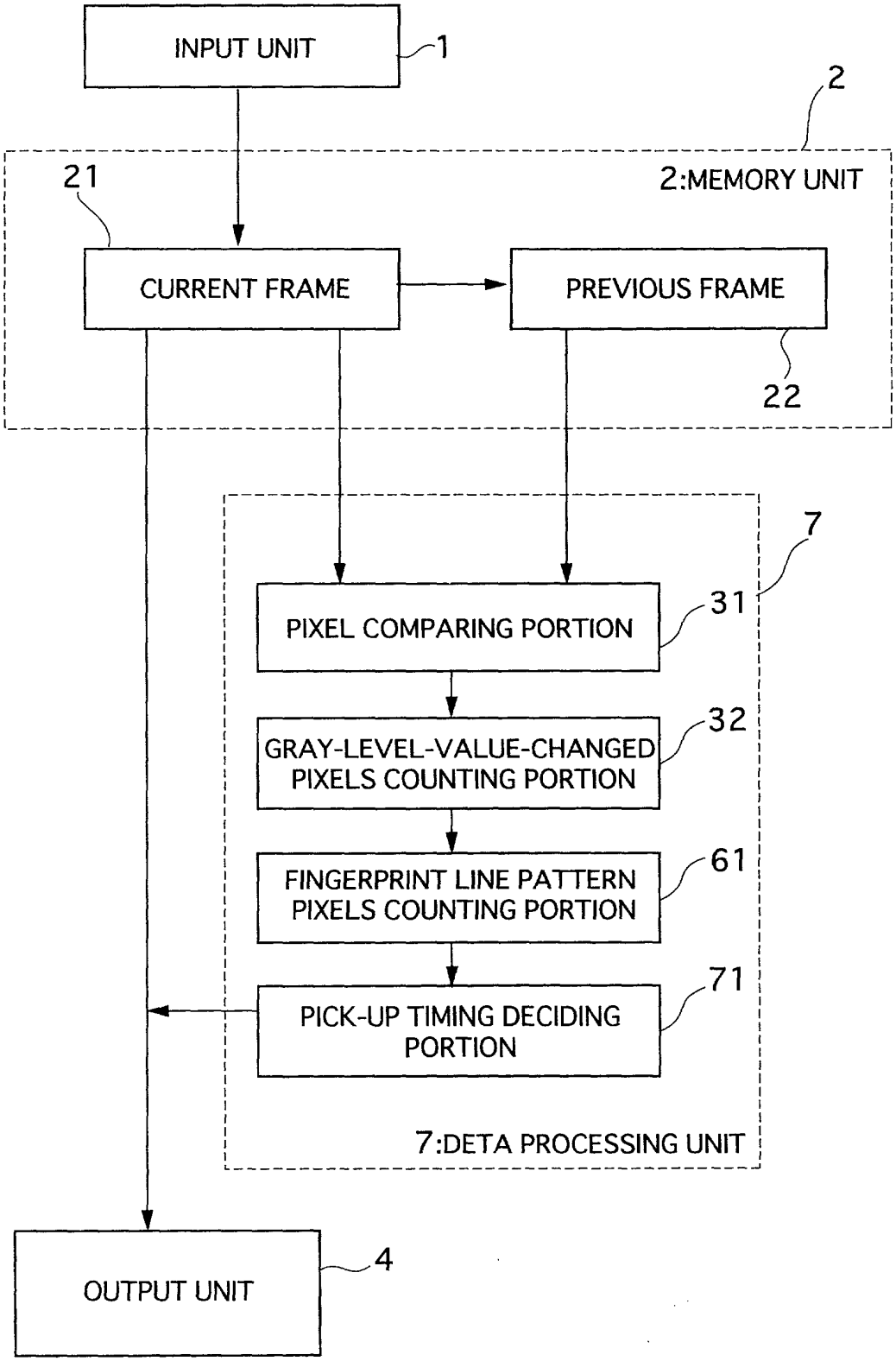

INPUT UNIT
1
2
2:MEMORY UNIT
21
CURRENT FRAME
PREVIOUS FRAME
22
7
PIXEL COMPARING PORTION
31
GRAY-LEVEL-VALUE-CHANGED PIXELS COUNTING PORTION
32
FINGERPRINT LINE PATTERN PIXELS COUNTING PORTION
61
PICK-UP TIMING DECIDING PORTION
71
7:DETA PROCESSING UNIT
OUTPUT UNIT
4

Fig. 8

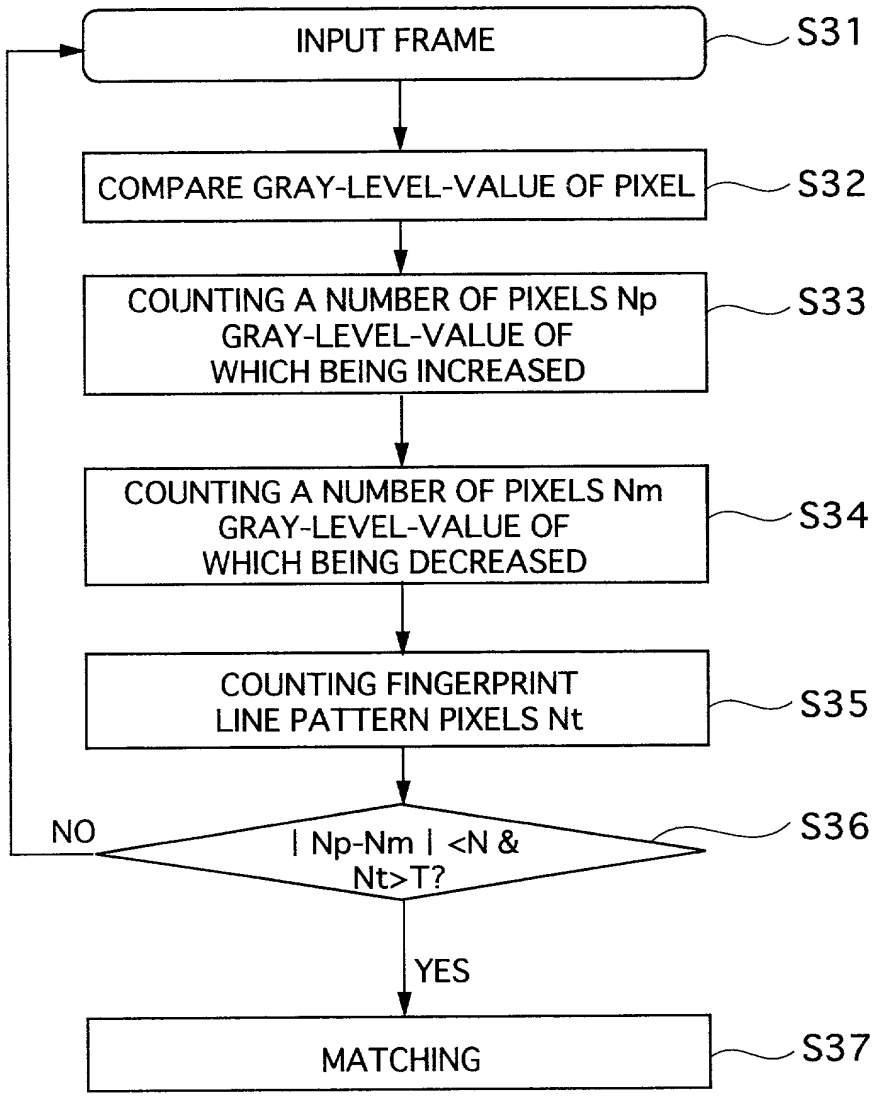

INPUT FRAME
S31
COMPARE GRAY-LEVEL-VALUE OF PIXEL
S32
COUNTING A NUMBER OF PIXELS Np GRAY-LEVEL-VALUE OF WHICH BEING INCREASED
S33
COUNTING A NUMBER OF PIXELS Nm GRAY-LEVEL-VALUE OF WHICH BEING DECREASED
S34
COUNTING FINGERPRINT LINE PATTERN PIXELS Nt
S35
NO
| Np-Nm | <N & Nt>T?
S36
YES
MATCHING
S37

Fig. 9

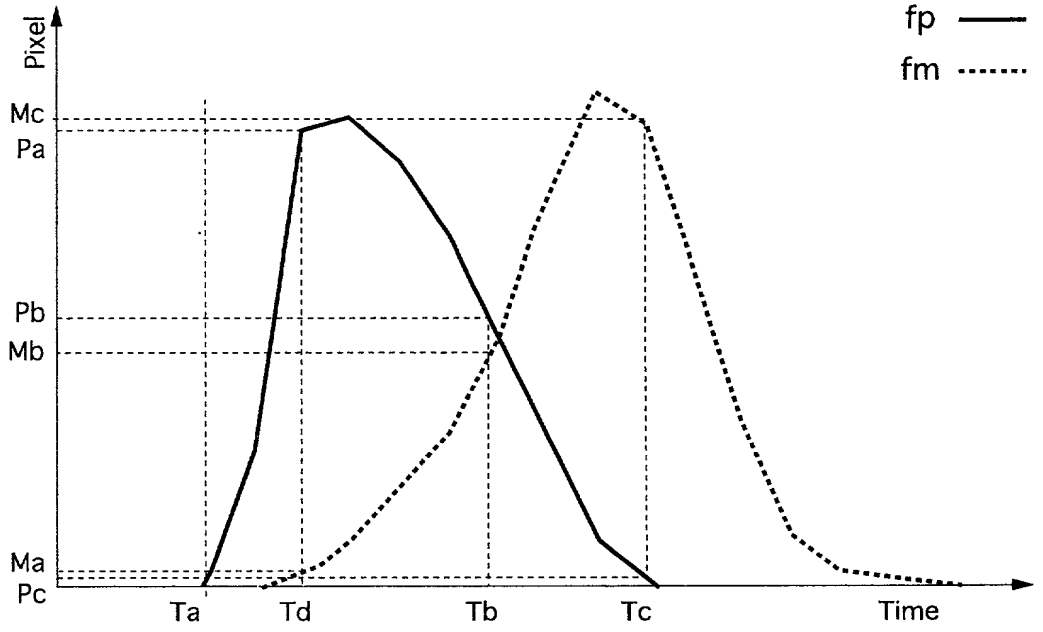

Pixel
fp
fm
Mc
Pa
Pb
Mb
Ma
Pc
Ta
Td
Tb
Tc
Time

Fig.10

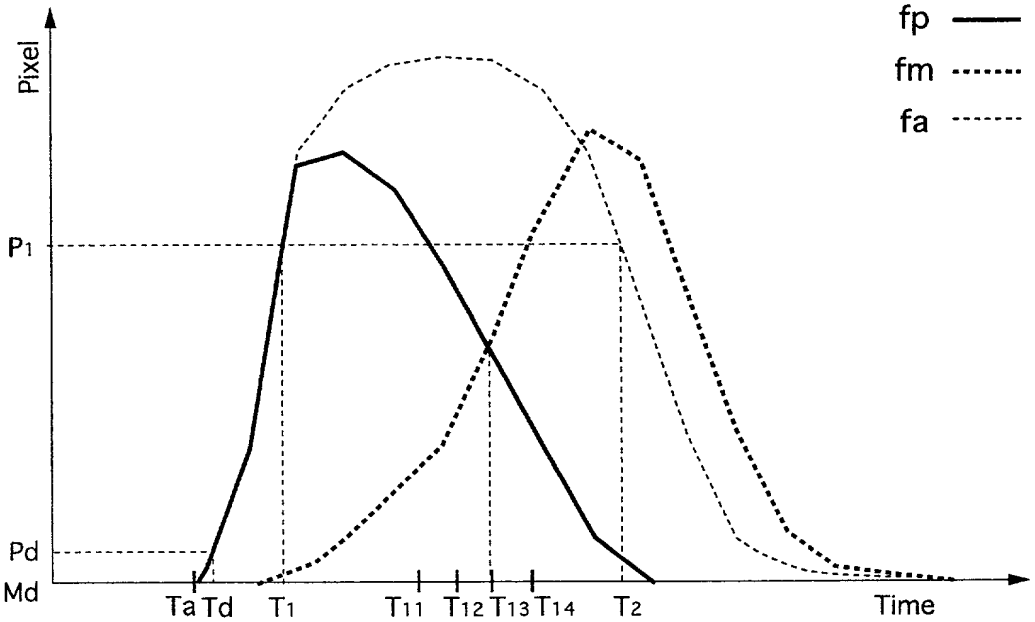

Pixel
fp
fm
fa
P1
Pd
Md
Ta
Td
T1
T11
T12
T13
T14
T2
Time

Fig.11

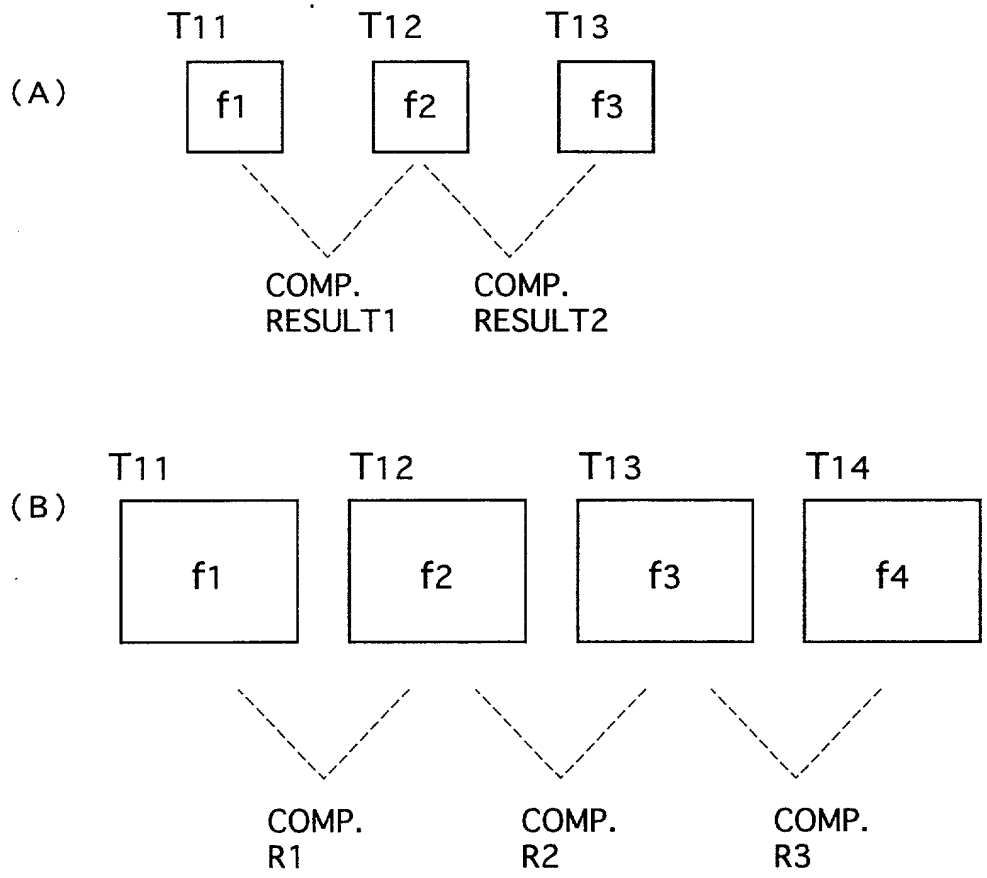
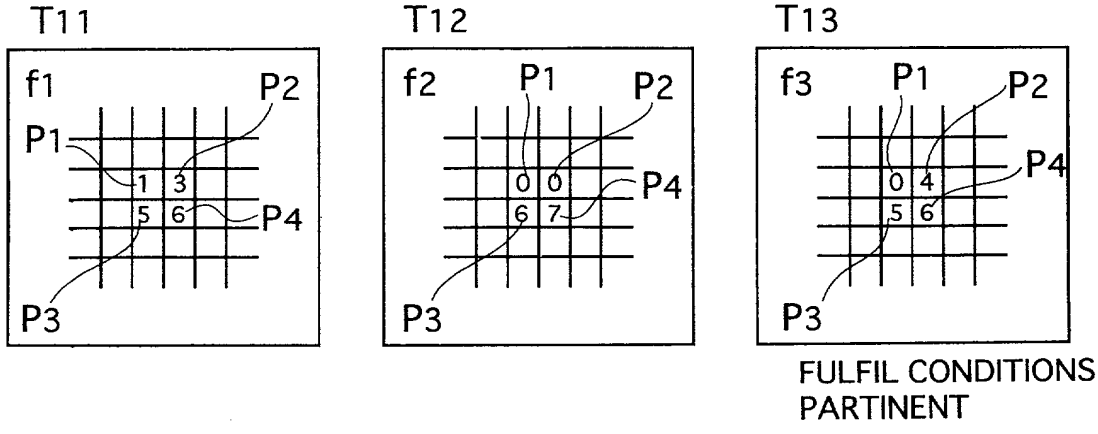

(A)
T11
T12
T13
f1
f2
f3
COMP. RESULT1
COMP. RESULT2
(B)
T11
T12
T13
T14
f1
f2
f3
f4
COMP. R1
COMP. R2
COMP. R3

Fig.12


T11
f1
P1
P2
P3
P4
1
3
5
6
T12
f2
P1
P2
P3
P4
0
0
6
7
T13
f3
P1
P2
P4
0
4
5
6
P3
FULFIL CONDITIONS PARTINENT